

be procured. In support of this directive as well as an existing urgent need for an AGS in the 9th Infantry Division (Motorized), Ft. Lewis, Wash., the feasibility of reviving the obsolescent M551 "Sheridan" armored reconnaissance-airborne assault vehicle was investigated. In April 1985, the investigation determined that the M551A1 could not be fully supported with current assets and cannot be considered a viable AGS candidate.

Current AGS efforts are directed toward resolving requirement, program management and acquisition issues. Pending availability of funds and program approval, a fiscal 1986 start is envisioned.

■ **Bradley Infantry Fighting Vehicle (IFV).** The "Bradley," the key to the Army's evolving mechanized infantry doctrine, was approved for full production in 1980, and the first production vehicle was delivered in May 1981. It is named for late General of the Army Omar N. Bradley. The M2 IFV entered service in early 1983, re-equipping mechanized infantry battalions in the 2nd Armored Division at Ft. Hood, Tex., followed by units of the 3rd Infantry Division (Mechanized) in West Germany and the North Carolina Army National Guard. Fielding during 1985 is to the 11th Armored Cavalry Regiment in West Germany, the 1st Cavalry Division at Ft. Hood and the Mississippi Army National Guard.

Production of the M2 IFV and the M3 cavalry fighting vehicle (see entry below) is scheduled into the 1990s for a total of 6,882 vehicles. Production is now running at about 55 units per month, and through 1 October, approximately 2,000 M2s and M3s had been delivered.

The characteristics of the IFV allow for mounted combat and provide the infantry a means to protect tanks and consolidate gains in the offensive. The principal design requirements for the Bradley were mobility equal to the most modern tanks, such as the M1, and main armament powerful enough to handle enemy light armor and support the infantry squad when dismounted action is necessary.

The vehicle's interior layout is designed for a nine-man infantry squad, including the two-man turret for the commander and gunner. The main armament is the McDonnell Douglas Helicopters M242 25-mm "Chain Gun." This is an externally powered weapon, cycled by an electrically driven chain drive. Both armor-piercing, discarding-sabot (APDS) and high-explosive (HE) ammunition are available, and the gun's dual-feed mechanism can accommodate either type in any combination, allowing the gunner to switch instantly to the type required by the target. The M2 carries 300 ready rounds for the main gun in the turret and a reserve of 600 rounds stowed in the rear compartment.

The M240C 7.62-mm coaxial machine gun, to the right of the main gun, is mounted in its own separate gas-proof box. There are 800 ready rounds for the coaxial gun and 1,540 stowed, as well as 2,200 stowed rounds for the infantry squad's M60 machine gun.

A dual-tube TOW antitank missile launcher, housed in an armored rectangular box, is hinged to the left side of the turret, folding flat against it for traveling and then raised through a 90-degree arc for firing. The high firing position allows the launcher to be fired while the vehicle's hull is behind cover, a practice facilitated by the launcher's separate elevation mechanism, permitting 20-degree depression and 30-degree elevation.

The IFV carries seven TOW missiles, two ready in the launch tubes. The launcher is reloaded through a hatch in the rear deck over the rear squad compartment, an armored cover giving some degree of protection during the operation. Any number up to five shoulder-fired Dragon antitank missiles may be carried in place of the stowed TOWs.

The turret stabilization system that allows the main gun to be fired while the vehicle is under way is considered one of the most accurate of its kind. Contributing to the accuracy are the relatively low turret mass, the optimum placement of gyros and the fact that the gun is mounted close to the vehicle's center line.

The main gun can be elevated to 60

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degrees (a NATO requirement) to engage aircraft and depressed to 10 degrees. The turret drive has two speeds—a slow (0.05 mils per second), extremely accurate rate for laying the main armament and a high-speed (60 degrees per second) slew rate for rapid engagement of alternate targets. The all-electric turret drive and stabilization system was chosen over hydraulic and hybrid models, which are considered vulnerable to flash fires.

The fire control system features an integrated day/night sight incorporating a thermal-imaging infrared device. The sight has 4x and 12x magnification and a "hard" optic relay that allows the commander to see the same sight picture as the gunner in the turret alongside him. The commander, who is seated on the right side of the turret, can override all turret and fire controls.

In the internal layout of the IFV, two infantrymen are seated facing one an-

other, to the left of the turret barbette and separated by it, and must turn to operate the firing port weapons mounted nearly midway along the left side of the hull. The other four squad members are in the rear using firing port weapons—two mounted in the rear ramp and two at the right rear of the hull.

The M231 firing port weapons are cut-down 5.56-mm M16 rifles in sealed ball mounts, modified to fire from an open bolt with a floating firing pin, so as to allow gun gases to be vented outside. The cyclic rate of fire is 1,050 to 1,250 rounds per minute. The weapons are sighted through armor-glass periscopes mounted directly above each position, using tracer ammunition exclusively to "walk" the gun onto the target. There are no sights as such. The M2 carries 4,000 5.56-mm rounds for the firing port weapons and another 2,160 stowed rounds for the squad's individual weapons.



A TOW 2 antitank missile is launched from an M2 Bradley infantry fighting vehicle.

The basic hull structure of the Bradley is of no. 5083 aluminum armor plate, a heat-treated alloy that includes zinc and magnesium. Some areas of the side slopes employ no. 7039 aluminum armor, which has better properties against kinetic-energy rounds. Steel armor is used to protect the face of the turret. Vertical hull armor is a spaced laminate, consisting of two ¼-inch high-hardness steel plates spaced 1 inch apart and mounted 3-½ inches outboard of a 1-inch aluminum armor base. There is also steel anti-mine appliqué armor ¾-inch thick on the bottom of the front third of the hull.

The front-mounted engine is the well-proven Cummins VTA-930T turbocharged diesel of 500 horsepower, driving through a General Electric HMPT-500 automatic transmission, the first hydromechanical power train to be adopted for any armored vehicle.

The six road wheels on each side, with shock absorbers mounted at the first, second and sixth stations, have a maximum vertical travel of 14 inches, permitting cross-country speeds up to 30 m.p.h.

The M2 has a top road speed of 42 m.p.h. and a cruising range of 300 miles on its 175-gallon fuel capacity. With a horsepower-to-weight ratio of 20 horsepower per ton—the highest of any tracked IFV in the world—the 25-ton M2 can climb a three-foot vertical wall, negotiate a 60-percent grade, move along a 40-percent side slope and cross an 8.3-foot trench. The vehicle can swim, making 4.4 m.p.h. in the water, propelled by its own tracks. The hull rides very low in the water, so a flotation barrier must be erected. The barrier is recessed in the front and side armor and can be erected by five men in four minutes and stowed in ten minutes.

An upgraded version of the Bradley IFV, the M2A1, will start coming off the production line in May 1986, in the lot of 655 vehicles covered by fiscal 1985 contracts. The first 355 of these vehicles will have a gas particulate filter unit for NBC protection and other "man-machine interface" improvements and will later be retrofitted with the improved TOW 2 missile system. The remaining 300 vehicles will have all of the M2A1 improvements built in on the assembly line.

Other improvements in the early-development stage include upgraded armor protection, further survivability measures, advances in main gun ammunition and better transportability.

The production, fielding and future development of the IFV and the cavalry fighting vehicle are under the management of the project manager for Bradley fighting vehicle systems. These are only two systems under the "umbrella" program manager for light combat vehicles, with offices at TACOM in Warren, Mich. FMC Corporation developed the Bradley vehicles and produces them for the Army.

■ **M3 Bradley Cavalry Fighting Vehicle (CFV).** Intended to replace the M113 armored personnel carrier, which has served as an *ad hoc* armored cavalry scout vehicle, the M3 is externally indistinguishable from the M2 infantry fighting vehicle and has the same armament and automotive performance.

The major difference between the two vehicles is the arrangement of the crew compartment and internal stowage, the CFV being designed to accommodate the five-man cavalry squad and their weapons.

The CFV, for instance, will carry twice as many stowed rounds for the 25-mm

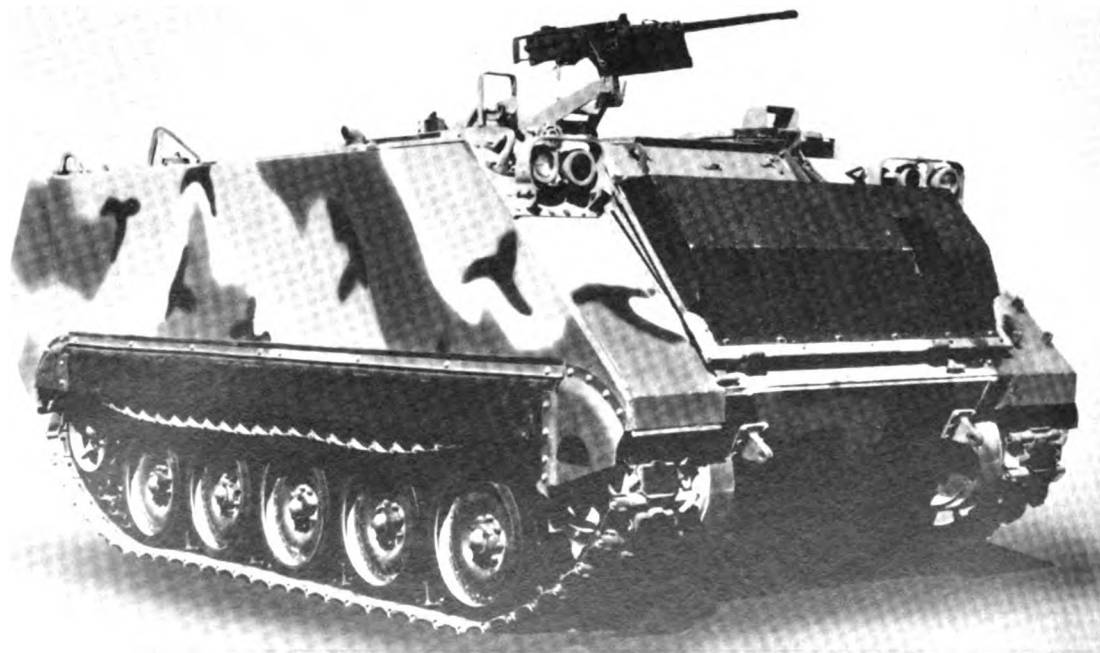
main gun—1,200—as the IFV (both carry 300 ready rounds) and ten TOW antitank missiles in addition to the two that both vehicles have ready in the launcher. The CFV crew seating arrangement is different, of course, with two reconnaissance crewmen in the rear compartment, in addition to the driver and the commander and gunner in the two-man turret. The CFV is not fitted with the 5.56-mm firing port weapons.

The Army has a requirement for about 3,300 M3s for use in armored cavalry units and the scout platoons of mechanized infantry and tank battalions.

■ **M113-Series Armored Personnel Carrier.** This is one of the most ubiquitous armored vehicles in the world, used in at least 41 countries, with about 75,000 having been built by U.S. and foreign licensed manufacturers. The standard carrier in mechanized infantry units, the tracked chassis has also been adapted to many other purposes in more than 20 different models.

Lacking the heavy fire support armament deemed necessary for mechanized infantry operations and unable to keep pace with the M1 tank, the M113 will be replaced as a squad carrier by the M2 IFV in most armored and mechanized divisions. It will be retained only in units which have M60-series tanks.

Nevertheless, M113s will be around well beyond the year 2000, and new vehicles, designated M113A3, will have armored external fuel tanks, up-rated engines and transmissions and spall liners to reduce the behind-armor effects of large shaped-charge antiarmor warheads. Eventually, these modifications will be applied to the entire Army fleet, which now numbers about 26,000 vehicles (in-



M113A3 armored personnel carrier, the latest version of this venerable and ubiquitous vehicle, showing the armored external fuel tanks added to rear of the hull. M113A3s will also have uprated engines and transmissions and interior spall liners to reduce the behind-armor effects of large shaped-charge antiarmor warheads.